

Name of the Student: _____

Max. Marks : 24 Marks

Time : 24 Minutes

Mark Schemes

Q1.

- (a) (If any factor is changed which affects an equilibrium), the (position of) equilibrium will shift / move so as to oppose / counteract the change.

Must refer to equilibrium

Ignore reference to "system" alone

A variety of wording will be seen here and the key part is the last phrase

OR

(When a system / reaction in equilibrium is disturbed), the (position of) equilibrium shifts / moves in a direction which tends to reduce the disturbance

An alternative to shift / move would be the idea of changing / altering the position of equilibrium

1

- (b) (i) M1

A substance that speeds up the reaction / alters the rate but is chemically unchanged at the end / not used up

*Both ideas needed for **M1***

*Credit can score for **M1**, **M2** and **M3** from anywhere within the answer*

M2

Catalysts provide an alternative route / alternative pathway / different mechanism

M3

that has a lower activation energy / E_a

OR

lowers the activation energy / E_a

3

- (ii) (Time is) less / shorter / decreases / reduces

Credit "faster", "speeds up", "quicker" or words to this effect

1

- (iii) None

1

- (c) (i) R

1

- (ii) T

1

(iii) R

1

(iv) P

1

(v) Q

1

[11]

Q2.

(a)	(i)	$\underline{3}\text{CH}_3\text{OH}$ <i>Not molecular formula</i>	1
		$\text{HOCH}_2\text{CH}(\text{OH})\text{CH}_2\text{OH}$	1
	(ii)	$\rightarrow 19\text{CO}_2 + 19\text{H}_2\text{O}$ <i>Or doubled</i>	1
		$\text{C}_{17}\text{H}_{35}\text{COOCH}_3 + 27\frac{1}{2} \text{ or } 55/2 \text{ O}_2$ <i>Consequential on correct right-hand side</i>	1
(b)	(i)	A0.7	1
		Ethanol6.4	1
		Water3.6	1
(ii)		No effect <i>If wrong, CE = 0</i>	1
		Equal moles on each side of equation OR V cancels <i>Ignore moles of gas</i>	1
(iii)	M1	$K_c = \frac{[\text{DEM}][\text{H}_2\text{O}]^2}{[\text{A}][\text{C}_2\text{H}_5\text{OH}]^2}$	
		<i>Must have all brackets but allow ()</i>	1
(iv)	M2	$\frac{2.1 \times (3.4)^2}{0.85 \times (7.2)^2}$	
		<i>If K_c wrong can only score M4 for units consequential to their K_c working in (b)(iv)</i>	1
	M3	0.55 (min 2dp)	1
	M4	No units	1

[13]